

PAPILLARY CARCINOMA THYROID

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THYROID CARCINOMA

- Major subtypes of thyroid carcinomas are
 - Papillary carcinoma (80% to 85%)
 - Follicular carcinoma (10% to 15%)
 - Poorly differentiated and anaplastic (undifferentiated) carcinoma (<5%)
 - Medullary carcinoma (5%)

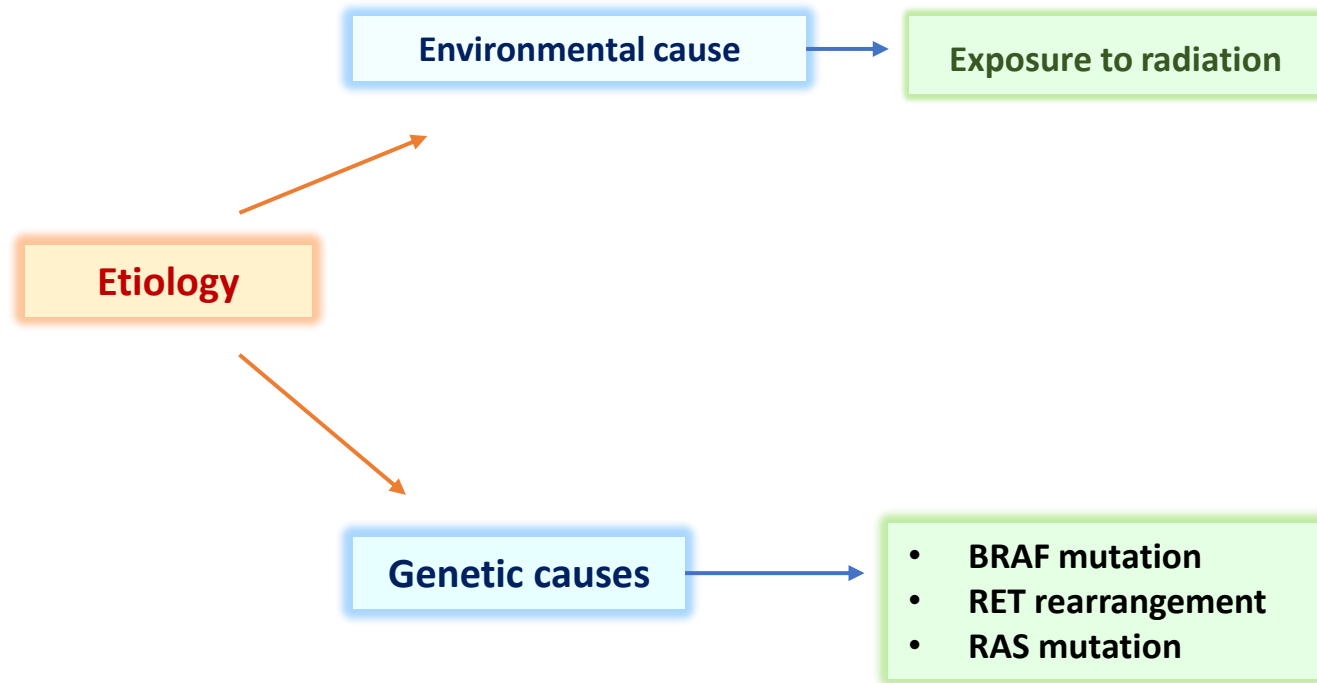


PAPILLARY CARCINOMA THYROID

- Malignant epithelial tumor of thyroid with cells showing distinctive nuclear features and follicular cell differentiation
- Age – can occur in both children and adults (median age – 50 years)
- Sex – predominance in females (female to male ratio – 3:1)



PAPILLARY CARCINOMA THYROID



Risk factors (relationship with PTC is not clear)

Obesity

Diabetes

Smoking

Alcohol consumption

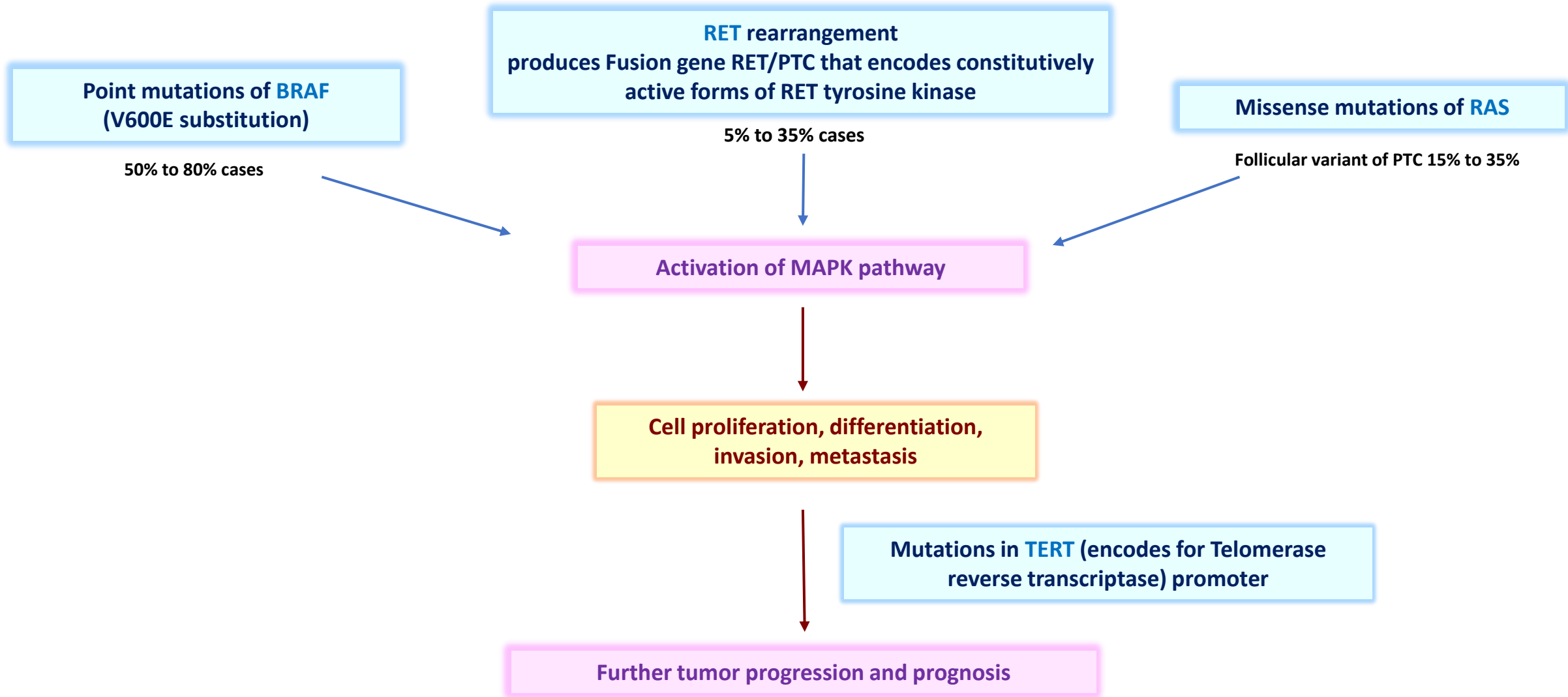
Dietary nitrates

Dietary iodine excess



PAPILLARY CARCINOMA THYROID

Genetic alterations

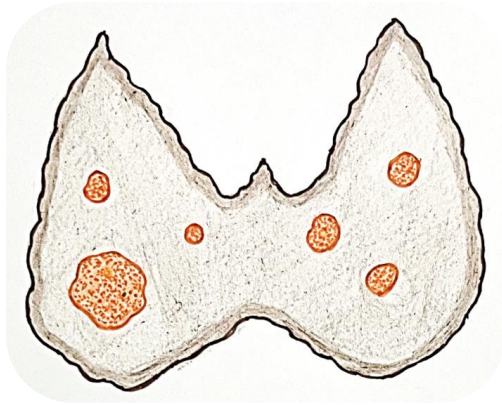


Mutations in **ALK gene** (rare)



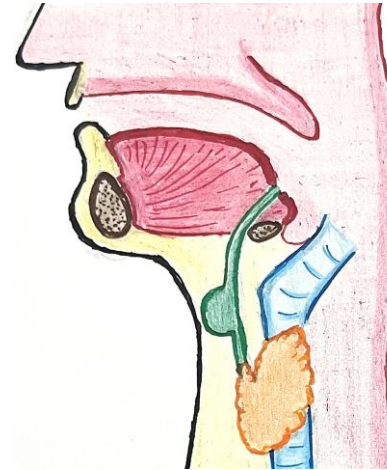
PAPILLARY CARCINOMA THYROID

LOCALIZATION



Anywhere in thyroid gland

Ectopic thyroid tissue



Thyroglossal duct cyst



Struma ovarii



PAPILLARY CARCINOMA THYROID

Clinical features

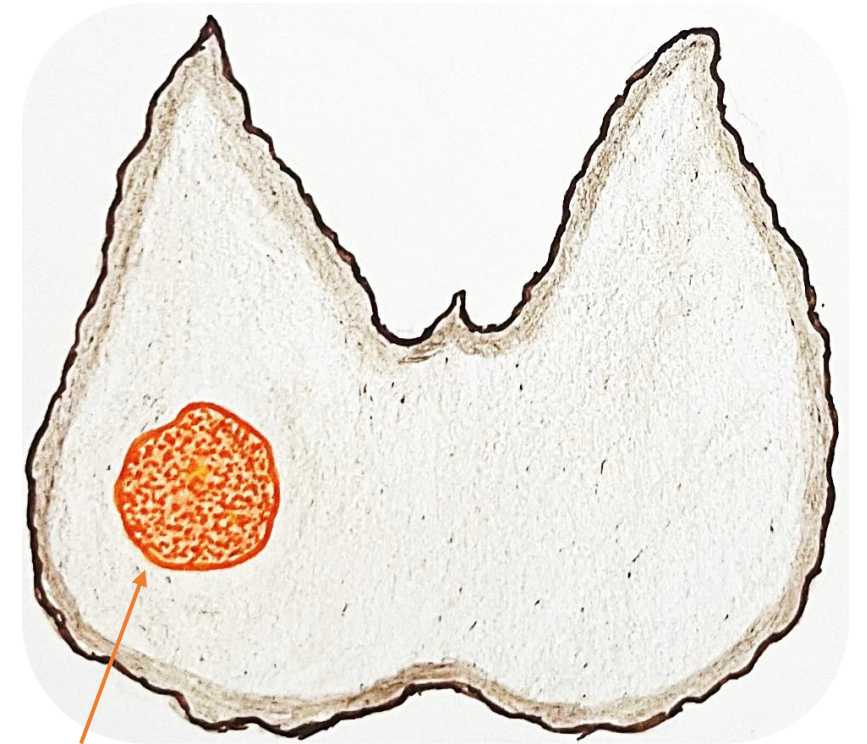
- Presents as **asymptomatic thyroid nodule** with or without involvement of cervical lymph nodes
- Hoarseness of voice and dysphagia occurs – if **recurrent laryngeal nerve** is involved
- **Thyroid function test** – no diagnostic utility and can be normal
- Thyroid scan (^{123}I) – usually presents as **cold nodule (hypo functioning)** (rarely presents as hyperfunctioning hot nodule)
- Ultrasound – hypoechoic or isoechoic nodule, microcalcifications and disorganized internal vascularity



PAPILLARY CARCINOMA THYROID

Gross :

- Tumor is gray white with irregular borders and firm consistence
- **Cut section** – granular white with specks of calcifications. Bone formation can also be seen
- **Size** – < 1mm to several centimetres
- May have variation depending upon variant of PTC

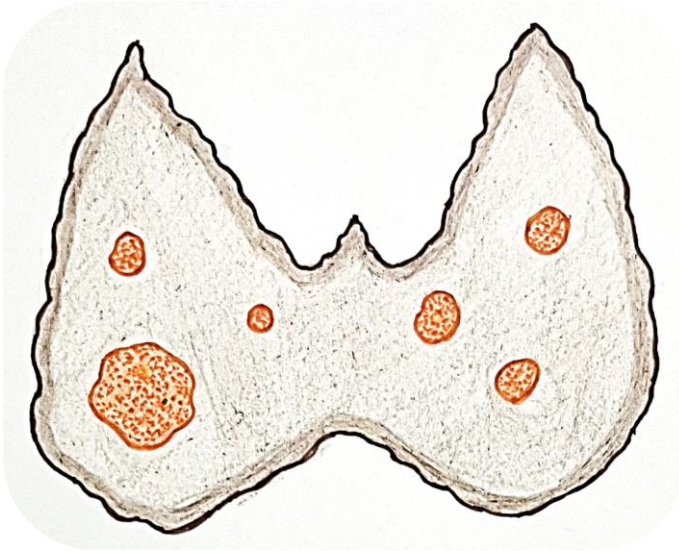


Lesion with granular surface

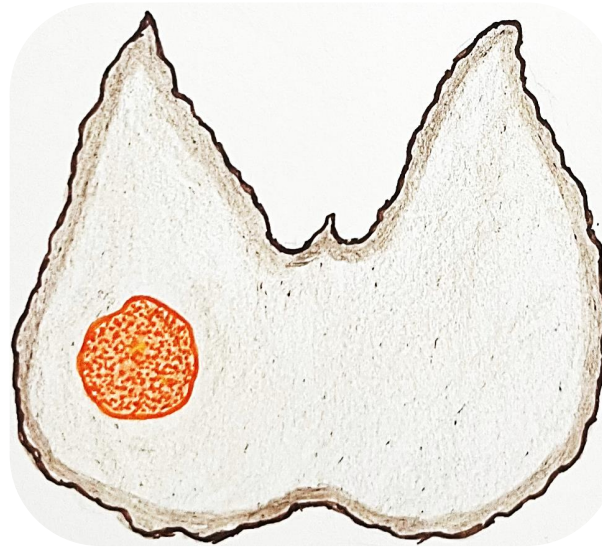


PAPILLARY CARCINOMA THYROID

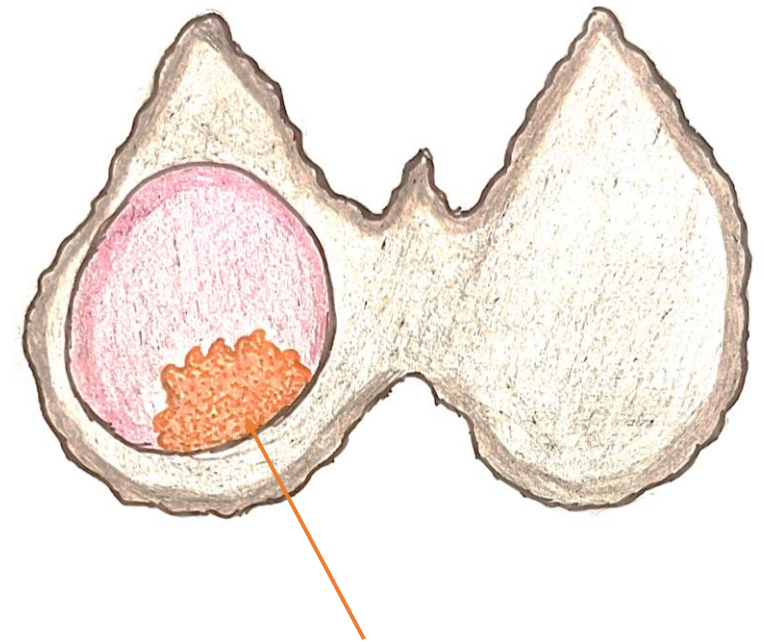
Clinical presentation



multifocal
(can be due to intraglandular lymphatic spread)



unifocal



Cystic with mural nodule



PAPILLARY CARCINOMA THYROID

Precursor lesions recognized are

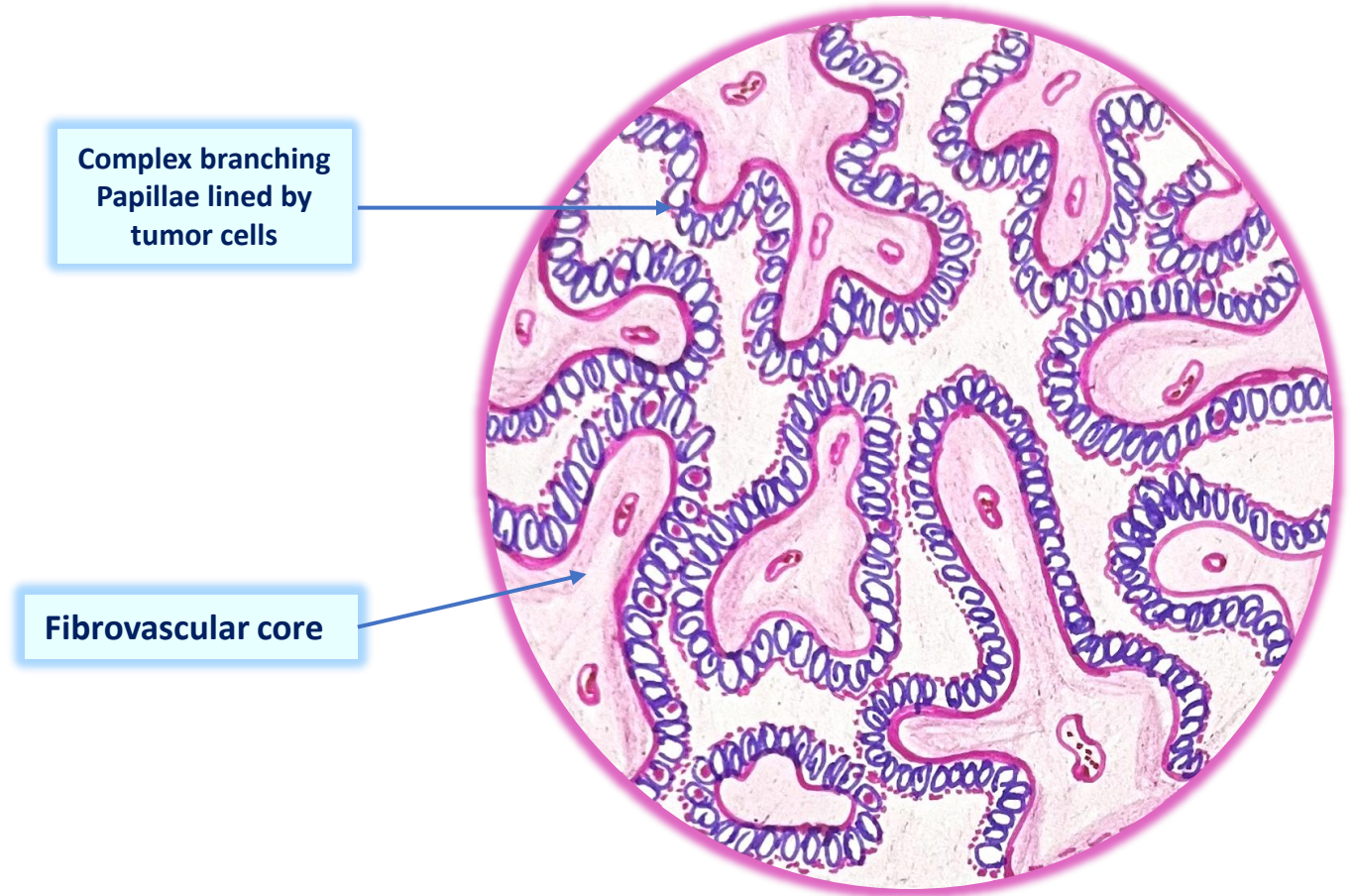
- **Papillary microcarcinoma** – as precursor for conventional papillary thyroid carcinoma
- **Non-invasive follicular thyroid neoplasm with papillary – like nuclear features-**
 - Low grade neoplasm with minimal risk of recurrence
 - Precursor to invasive encapsulated follicular variant of papillary thyroid carcinoma



PAPILLARY CARCINOMA THYROID

Microscopy:

- Tumor is composed of papillary structures with complex branching papillae
- Papillae have fibrovascular core and are lined by cells showing loss of polarity and with pale or eosinophilic cytoplasm
- Squamous metaplasia is also seen (20 to 40% cases)



PAPILLARY CARCINOMA THYROID - MICROSCOPY

Papillae with fibrovascular core

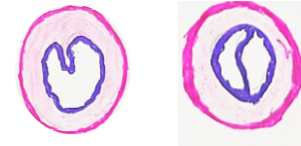
- Nuclear enlargement
- Elongated oval shape

Overlapping

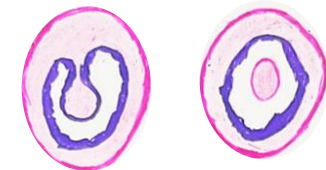
Ground glass appearance or clearing
(Orphan Annie eyed)

Nuclear membrane is thickened irregularly by
the opposition of chromatin material

Nuclear grooves



Nuclear pseudoinclusions



Psammoma bodies

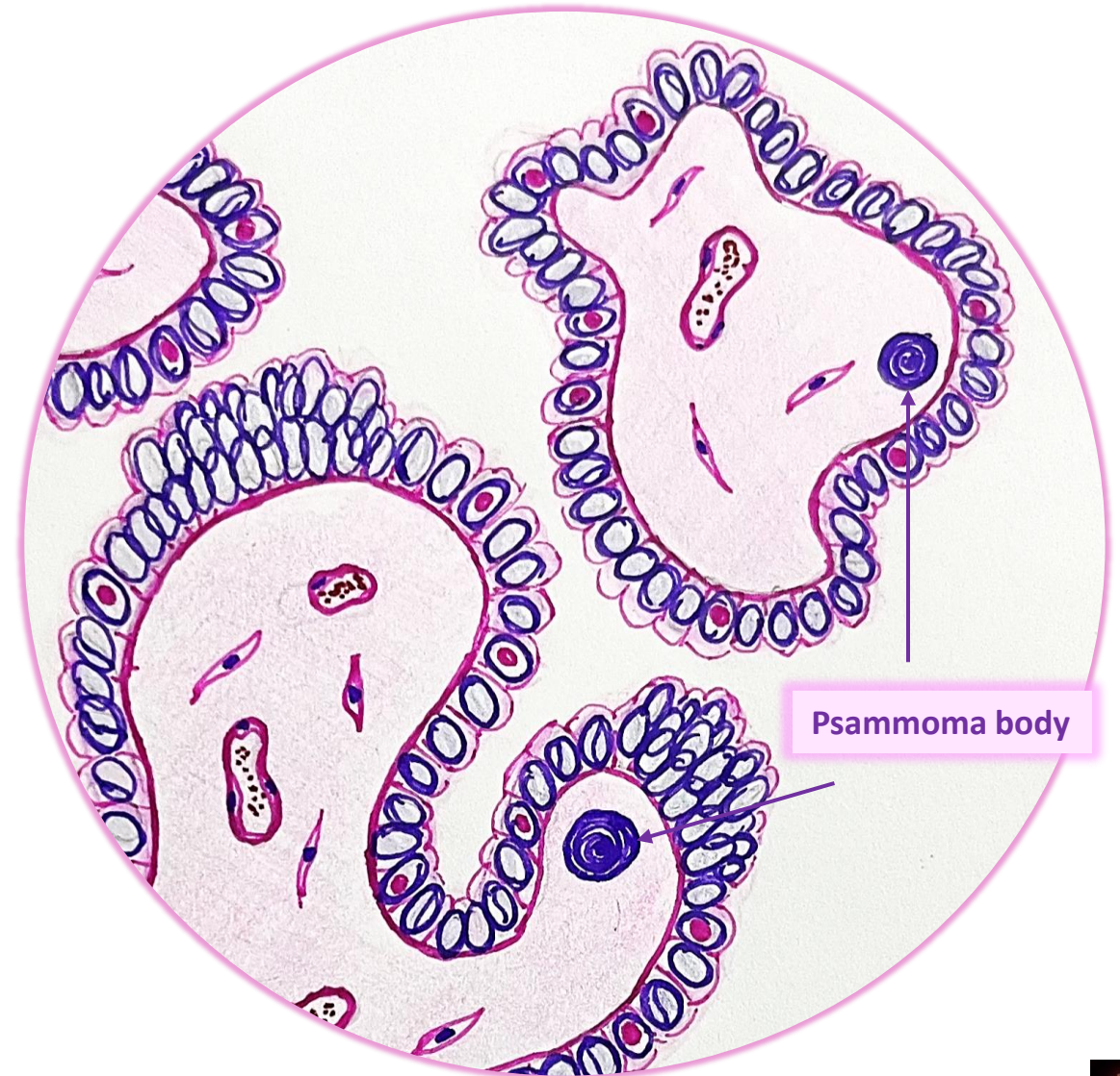
Cytoplasm of the tumor cells is generally is
acidophilic or pale



PAPILLARY CARCINOMA THYROID

Microscopy

- Psammoma bodies may be present (50% of cases). They are rounded and laminated concentrically deposited calcium around the necrotic tumor cells (dystrophic calcification)
- They are present with in lymphatic spaces or with in tumor stroma
- Intratumoral sclerosis and peritumoral lymphocytic infiltration are found



PAPILLARY CARCINOMA - VARIANTS

Papillary microcarcinoma

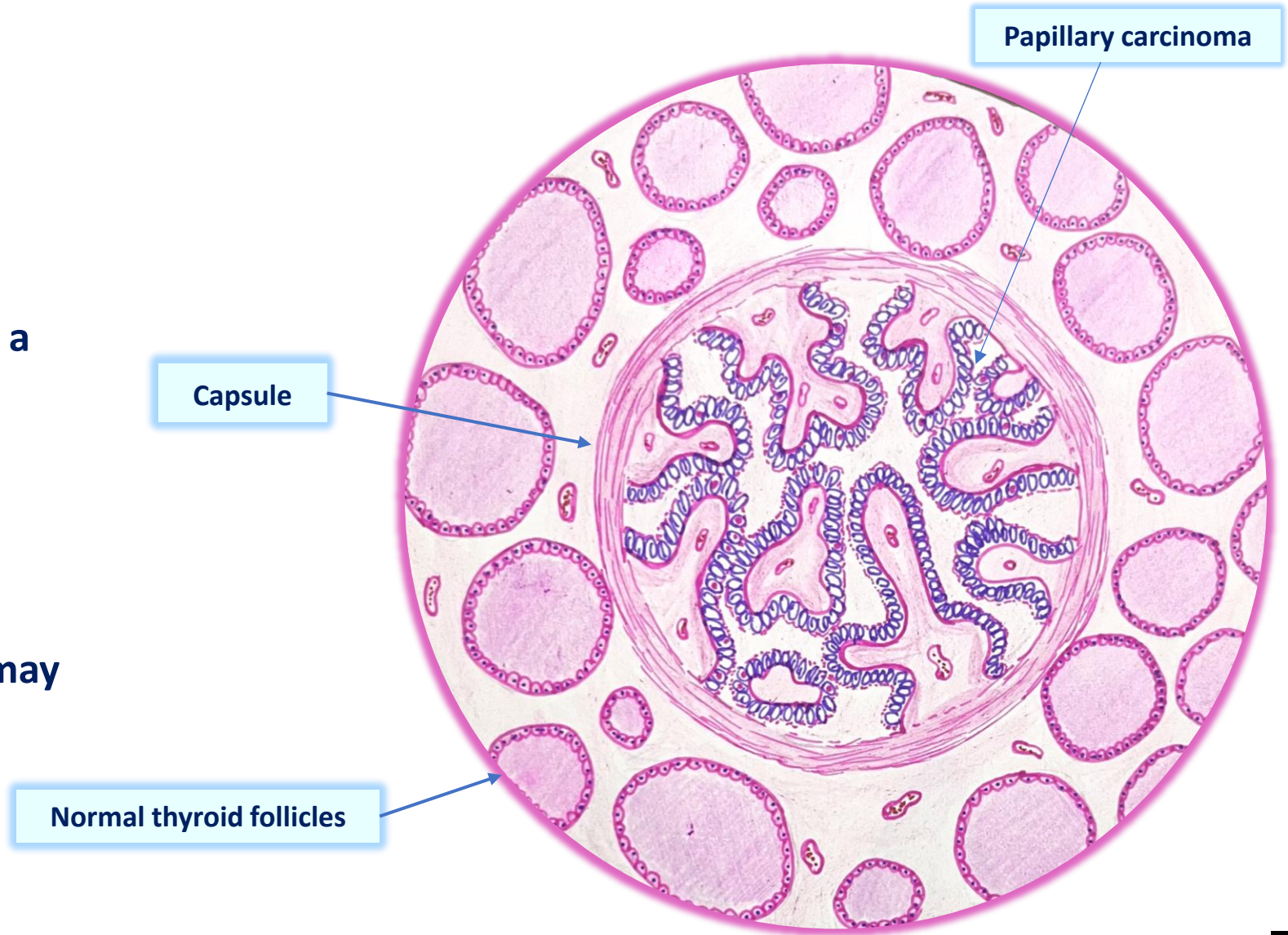
- m/s less than 1cm in diameter
- Also called – occult sclerosing carcinoma, occult papillary carcinoma
- **Microscopically** presents as irregular scar like configuration with neoplastic elements at periphery and other elements are entrapped in the centre
- Some tumors are completely capsulated and may be focally calcified
- Prognosis - excellent



PAPILLARY CARCINOMA - VARIANTS

Encapsulated variant-

- Tumor has typical papillary architecture and is surrounded by a fibrous capsule
- Accounts for 10% of cases of PTC
- Prognosis – excellent
- Regional lymph node metastasis may occur



PAPILLARY CARCINOMA - VARIANTS

Follicular variant

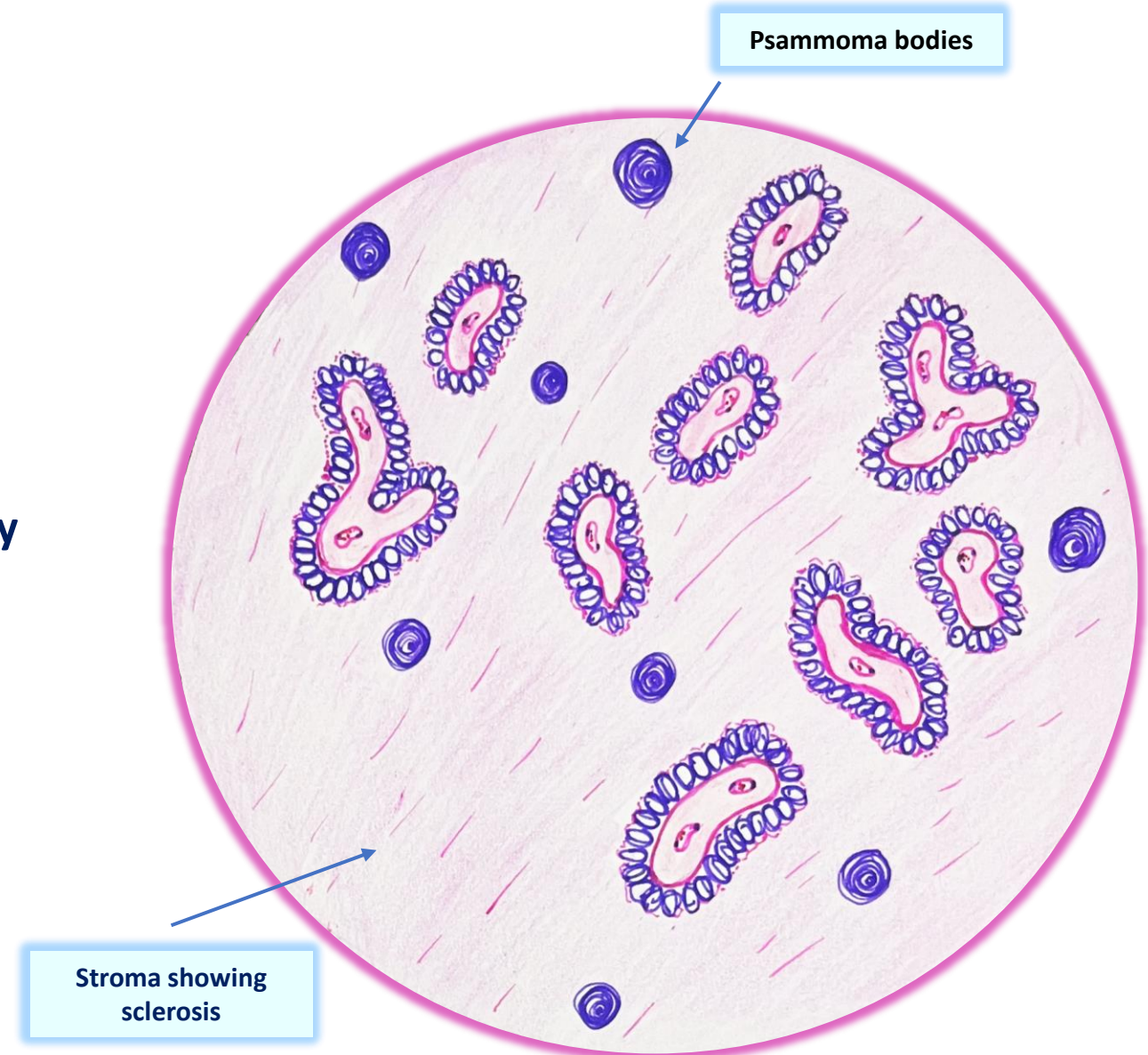
- Tumor has **follicular growth pattern** and can be infiltrative or encapsulated with invasion
- Nuclei of the cells lining the follicles have features of conventional PTC
- Colloid is thick appearing homogenous and strongly eosinophilic
- In some tumors, follicles are large cystically dilated – **macrofollicular variant**



PAPILLARY CARCINOMA - VARIANTS

Diffuse sclerosing variant

- Uncommon variant occurring in second and third decades and is common in women
- **Clinical presentation** – diffuse enlargement of thyroid
- **Microscopically** – entire thyroid or single lobe may be involved
- Characterized by dense sclerosis, numerous psammoma bodies, and chronic lymphocytic thyroiditis changes in background
- This variant is associated with extrathyroidal extension, cervical lymphnode metastasis and metastasis to distant organs mainly to lungs



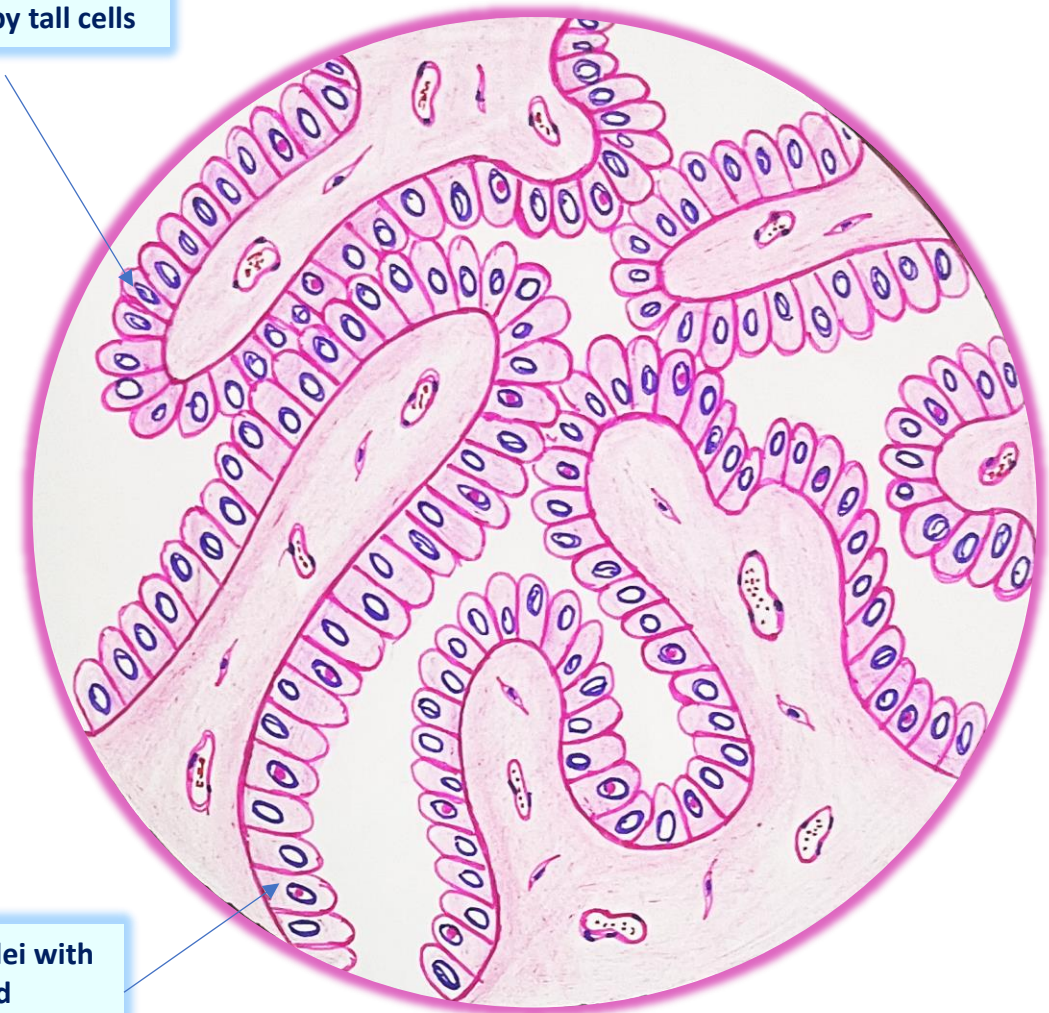
PAPILLARY CARCINOMA - VARIANTS

Tall cell variant

- Characterized by the cells which are **two to three times as tall as they are wide** and show **abundant eosinophilic (oncocytic-like) cytoplasm**
- Nuclear features of PTC are present
- Tall cells should account for **> 30%** of tumor to diagnose as tall cell variant
- Occurs in older individuals and has worse prognosis
- Extrathyroid extension and metastasis to other sites is common
- Prognosis- less favorable

Papillae lined by tall cells

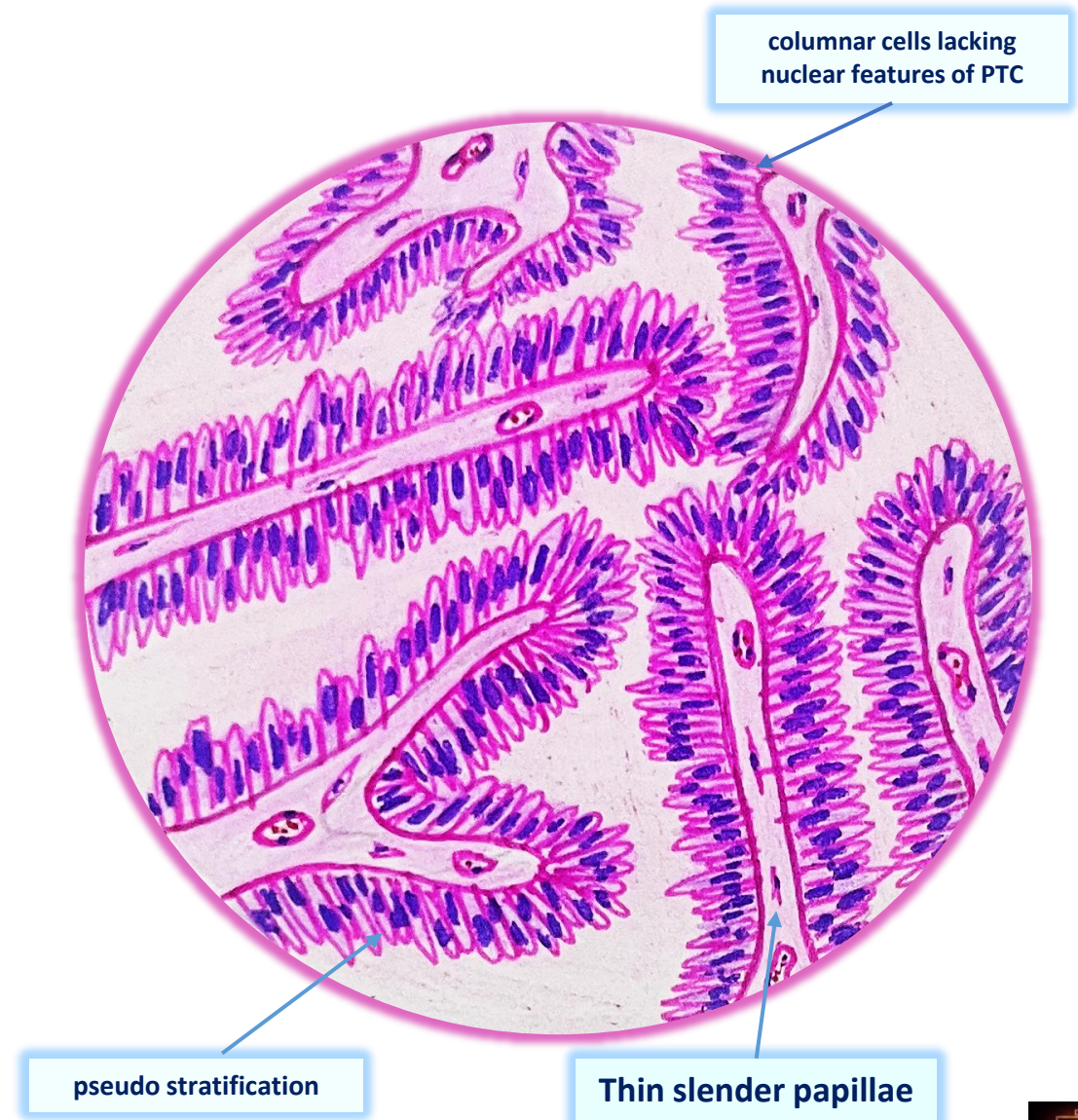
Ground glass nuclei with grooves and pseudoinclusions



PAPILLARY CARCINOMA - VARIANTS

Columnar cell variant

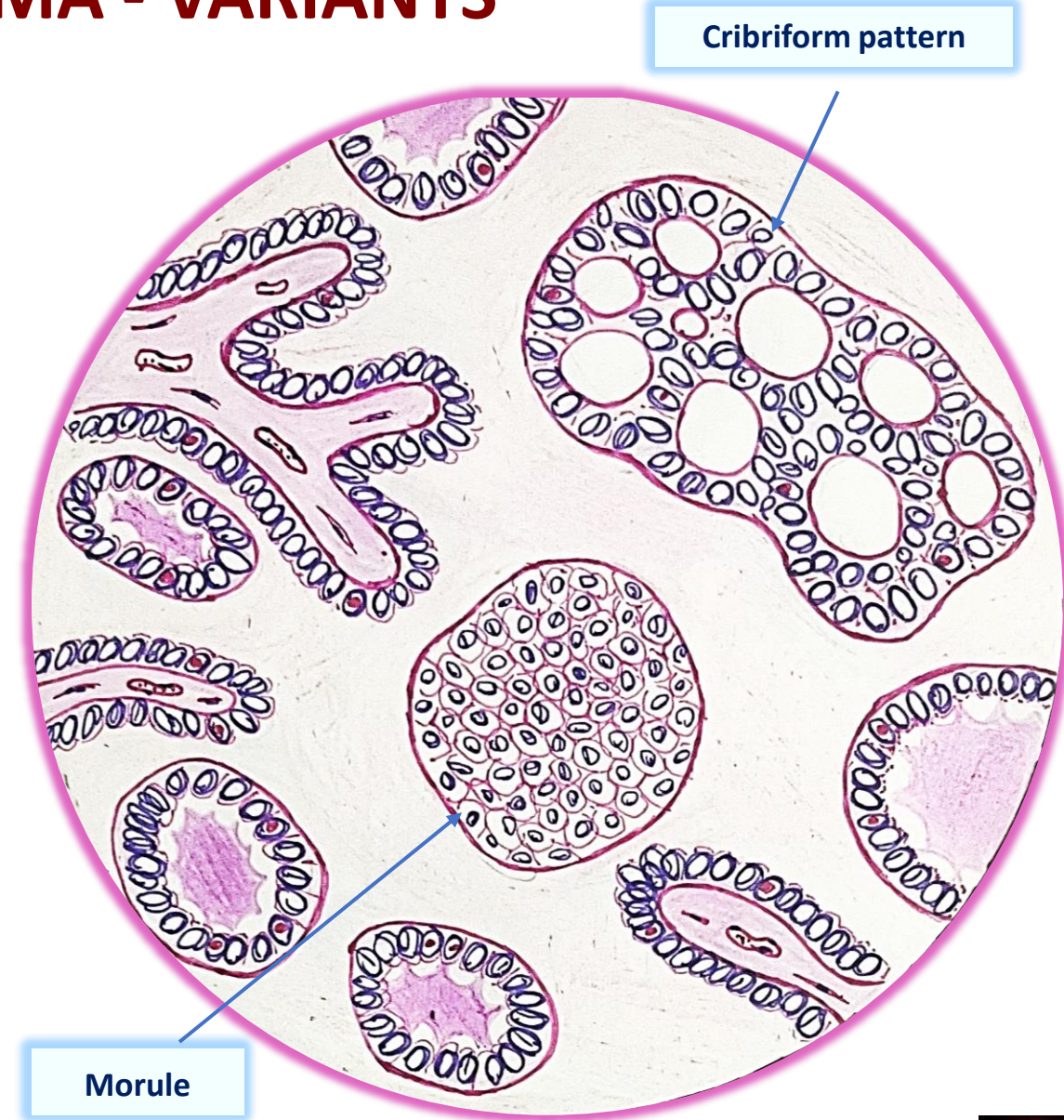
- Characterized by **columnar cells with prominent pseudo stratification**
- Cells **lack nuclear features of conventional PTC**
- These tumors are hypercellular neoplasms showing thin papillae or glandular like spaces lined by pseudostratified epithelium
- Tumor cells may show subnuclear vacuolization or clear cytoplasm similar to as seen in endometroid or intestinal adenocarcinoma



PAPILLARY CARCINOMA - VARIANTS

Cribriform or morular variant

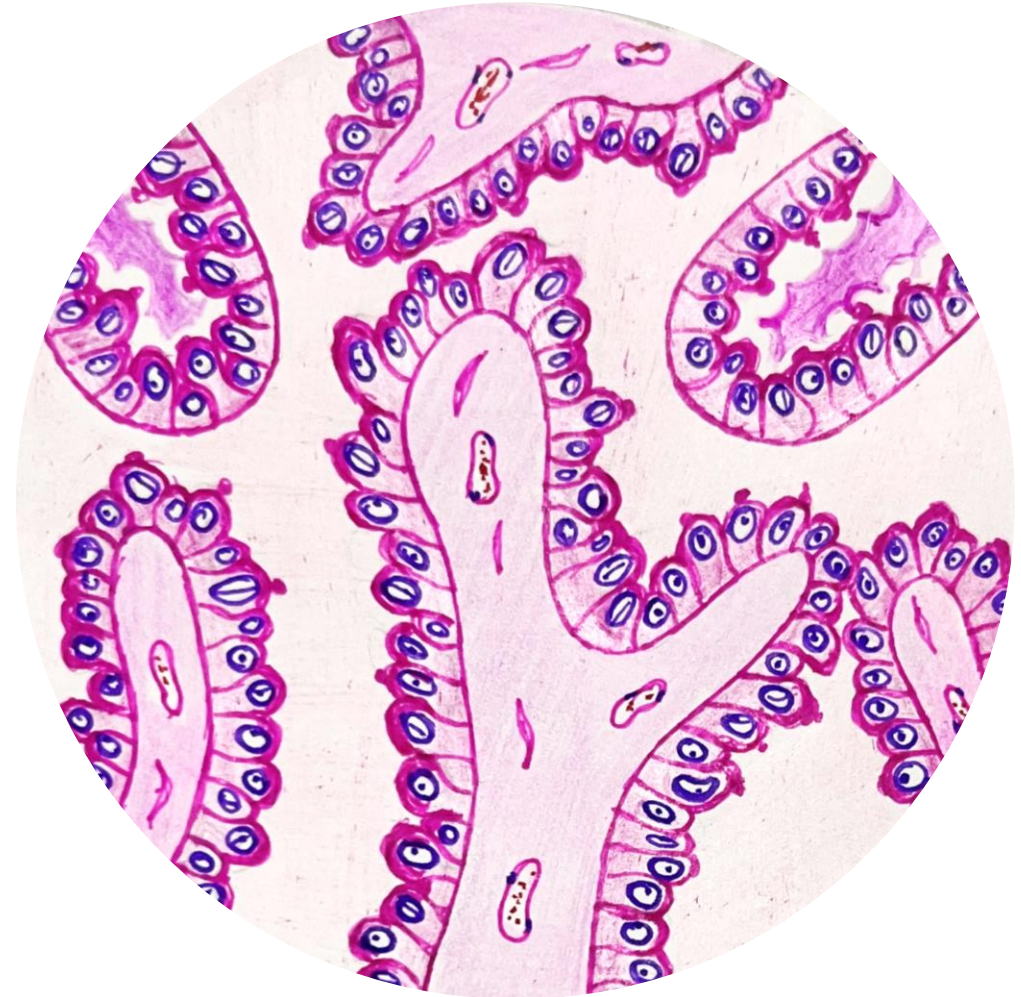
- Occurs **exclusively in females**
- can occur sporadically or as a manifestation of familial adenomatous polyposis
- **Morphology** – tumor is encapsulated and shows admixture of cribriform, trabecular, papillary, follicular and solid growth patterns with round squamoid structures called morules
- Papillae are lined by columnar shaped cells and intraluminal colloid is absent
- Nuclei may not be clear but have grooves and pseudoinclusions
- Morules contain optically clear nuclei



PAPILLARY CARCINOMA - VARIANTS

Hobnail variant

- Tumor should contain > 30% of cells with hobnail features
- Tumor shows complex papillary and micropapillary structures lined by follicular cells containing eosinophilic cytoplasm, apically located nuclei showing decreased N:C ratio and prominent nucleoli and has loss of cellular cohesion
- Extrathyroidal extension, angiolymphatic invasion, necrosis and atypical mitotic figures are common



PAPILLARY CARCINOMA - VARIANTS

Oncocytic variant

- Rare variant
- characterized by papillary tumors with oncocytic cell
- Cells have abundant eosinophilic granular cytoplasm
- Nuclear features are of papillary thyroid carcinoma



PAPILLARY CARCINOMA - VARIANTS

Solid or trabecular variant

- Characterized by solid or trabecular growth pattern
- Solid variant constitutes 1 – 3% of adult papillary carcinoma
- Tumor cells show features of conventional PTC
- Poor prognosis and is associated with lung metastasis



PAPILLARY CARCINOMA - VARIANTS

Other rare variants include

- Spindle cell variant
- Clear cell variant
- Warthin-like variant



PAPILLARY CARCINOMA THYROID

Mode of spread

- Most common - Lymphatic spread
- Minority of cases – hematogenous spread to lungs

Diagnostic tests

- Radionuclide scanning
- Fine needle aspiration cytology
- Scintigraphy – presents as cold nodule
- Ultrasound – hypoechoic or isoechoic nodule, microcalcifications and disorganized internal vascularity
- Biopsy



PAPILLARY CARCINOMA THYROID

Prognosis

- Excellent with 10 year survival of about 95%
- Papillary microcarcinoma and Non-invasive follicular neoplasm with papillary like nuclear features – excellent prognosis. Lobectomy is treatment (total thyroidectomy is not required)
- Local and regional recurrences – 5% to 20% of patients
- Distant metastasis – 10% to 15% of patients
- Less favourable prognostic factors are –
 - Age more than 40 years
 - Presence of extrathyroidal extension
 - Presence of distant metastasis



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